

EARLY STAGES OF A SOUTHERN CALIFORNIA
GEOMETRID MOTH, DREPANULATRIX
HULSTI HULSTI (DYAR)

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DR. DYAR, IN 1904, named "*Catopyrrha hulsti*" from a specimen contained in the Hulst collection under another name, without designating the locality of its origin. Dr. Rindge (1949) gave valuable data on the species, and its two subspecies, *D. carneolata* B. & McD. (1917) and *D. verdiaria* Grossbeck (1912) in his Revision of the Genus. He lists *D. carneolata* as an Arizona form of *Drepanulatrix hulsti*, and mentions California examples that seem indistinguishable from Arizona specimens.

He places *Drepanulatrix rindgearia* Sperry (1948) as a synonym of *D. hulsti*. He also notes that the early stages are unknown.

D. hulsti hulsti ranges throughout the greater portion of coastal California, wherever its food plant, *Ceanothus*, occurs.

It flies most abundantly from May to August, but has been reported as early as January, and late into September.

Eggs of this species were obtained this year (1962) in Del Mar, on several occasions, from May 25 to late August. For the most part these were laid singly on their sides. When first laid they were light green, with a pearly luster. Shortly they changed to cream or light tan, with contrasting dots and irregular tortuous bands of dark pink to salmon-red.

The characteristic form is ovoid, with a flattened base and rounded tip, but some approach a barrel-shaped form with flattened base. Our illustration (figure 1 A to C) shows the extremes of this variation, and also the early and late changes in markings.

Sculpture of the surface consists of longitudinal ridges, from 28 to 36 in number, running from the edge of the flattened base to the top. These ridges have 'pearled' edges, the pearls or raised points corresponding to the numerous horizontal lines crossing between the ridges. The raised pearls are small and relatively inconspicuous.

On the flattened base the ridges end abruptly, and within the circle formed by their terminations the surface is covered by numerous irregular hexagonal pits with raised walls, as shown in figure 1B.

There is considerable variation in the size of eggs, the average being 1 mm. tall by 0.6 mm. wide. Eggs laid May 25 hatched June 3. The larval egress was through one end, the remainder of the shell being left intact.

By comparison with the egg of *Drepanulatrix monicaria* it is larger, the number of ridges greater, and the salmon-red markings heavier.

FIRST INSTAR LARVA: Length, 3.75 mm. Head width, 0.4 mm. The head is wider than the first segment. The ground color is white with a heavy spotting of black dots on a brown base each side of the epicranial suture and the outer and upper two-thirds of each cheek. There are two raised papillae on the front. The mouth parts are brown, and the ocelli black on a white ground.

The first thoracic segment is narrower than the head, but wider than the remaining segments. The ground color of all body segments is white. There is a longitudinal middorsal irregular band of olive which is somewhat restricted at the segmental junctures. A narrow irregular dorso-lateral band parallels it. There are several rows of black papillae running generally in a longitudinal direction. The placement of these on the dorsal surface is shown in the illustration, (figure 1D). Each papillus is surrounded at its base by a white cirlet, and mounts a black seta at its tip.

The legs are hyaline, with a tinge of light yellow. The single pair of prolegs and the anal prolegs are concolorous with the body.

LARVA OF 15 MM. LENGTH: Head width, 1.5 mm. Head, gray, spotted with black, the spotting heaviest on the margin of the crown and cheeks. The front is slightly less spotted. The mandibles and ocelli are black.

The body ground color is gray. Most of the segments are crossed transversely by five or six folds, on which are placed prominent black papillae bearing black setae. The entire surface of the body is heavily sprinkled with minute black and brown dots. These have a slight tendency to form longitudinal lines. The spots on the ventral surface are predominantly brown and are more definitely arranged in longitudinal lines.

The prolegs are concolorous with the body, and the true legs are less spotted and more hyaline.

MATURE LARVA: Length, 26 mm. Head width, 2.2 mm. Head; color, gray-brown, heavily spotted with minute brown dots. The front is finely ridged horizontally, with a line of six minute black dots running transversely near the lower edge. The labrum is darker, and is ridged longitudinally. The maxillae are dark brown, the ocelli black, and the antennae translucent.

Across the center of each cheek is a lunate black band, beginning near the epicranial suture, extending laterally, then arching inferiorly to end near the ocelli. The setae are brown, and arise from black papillae. The head is shown in front view on figure 1E.

BODY: Ground color, whitish gray, nearly obscured by numerous small brown and black dots. There is a suggestion of a double middorsal longitudinal brown stripe in the thoracic area. A poorly defined dark spiracular band, made up of dots, is present on some specimens. The spiracles have narrow black rims and cream colored centers. The legs

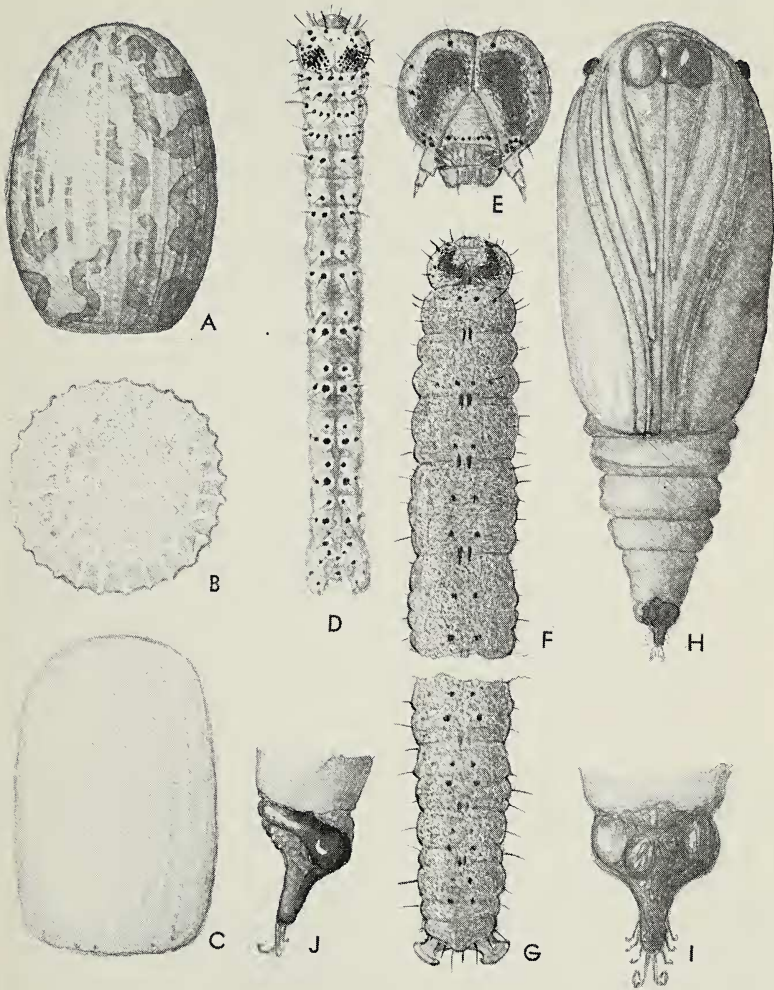


Figure 1

Early stages of *Drepanulatrix hulsti hulsti*. A. Egg, lateral aspect final color phase, enlarged X 40. B. Base of egg, enlarged X 40. C. Egg, elongate form, and early light phase, enlarged X 40. D. First instar larva, dorsal aspect, enlarged X 21. E. Head of mature larva, front view, enlarged X 10. F. and G. Mature larva, dorsal aspect, enlarged X 5.5. H. Pupa, ventral aspect, enlarged X 6. I and J. Cremaster, ventral and lateral aspects, enlarged X 14.

Reproduced from water color drawing by the author.

and prolegs are translucent, the latter being spotted with brown. The crochets are red-brown, apparently biordinal in alignment, and developed only along the lateral edge of the oval foot-pad, with short stubs only on the medial edge. The setae are light brown, relatively short, and arise from minute black papillae. (figure 1 F and 1 G).

Pupation occurred on the floor of the rearing jar, among leaves and debris, mixed with a few strands of silk.

PUPA: Length, 14 mm. Greatest width, through middle of wing cases, 4.2 mm.

The anterior two-thirds of the pupa is relatively wide and plump. The six terminal segments taper sharply to a distinctive cremaster, as will be noted on figure 1 H. An enlargement of the latter is pictured on figure 1 I.

The eyes are prominent, dark, and protruding. The cephalic end is evenly rounded. The antennae and maxillae extend to the margins of the wing cases. The spiracles are relatively small and nearly indistinguishable without a lens. There are no setae.

The color of the pupa is predominantly reddish brown, but the eyes and cremaster are black.

The cremaster is pear-shaped, with the stem end narrowed and elongated. Laterally it bears two globular bodies, one on each side, when viewed in ventral aspect. Portions of the surface are nodular. The tip bears several short spicules which arch dorsally. Two of these are longer, and recurve ventrally. These details can best be grasped by referring to the illustration on figure 1H.

The texture of the body surface of the pupa is predominantly smooth and glistening.

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